IV. *An Account of an Eruption of Mount Veſuvius, which happened in* Auguſt, 1779. *In a Letter from Sir* William Hamilton, *K. B. F. R. S. to* Joſeph Banks, *Eſq. P. R. S.*

Read Dec. 16, 1779.

SIR, Naples, October 1, 1779.

THE late eruption of Mount Veſuvius was of ſo ſingular a nature, ſo very violent and alarming, that it neceſſarily attracted the attention of every one, not only in its immediate neighbourhood, but for many miles around; and, conſequently, ſeveral ſlight deſcriptions of it have been already handed about, and ſome (as I am informed) more accurate and circumſtantial are preparing for the preſs [a].

That on which the Abbot BOTTIS is actually employed, by command of his Sicilian Majeſty, will undoubtedly be executed with the ſame accuracy, truth,

(a) The inhabitants of this great city in general give ſo little attention to Mount Veſuvius, though in full view of the greateſt part of it, that I am well convinced many of its eruptions paſs totally unnoticed by at leaſt two thirds of them.

and preciſion, as have rendered that author's former publications upon the ſubject of Mount Veſuvius ſo univerſally and deſervedly eſteemed.

Such a publication, executed with magnificence in the royal printing office, may, perhaps, render every other account of the late eruption ſuperfluous: nevertheleſs, I ſhould think myſelf in ſome degree guilty of a neglect towards the Royal Society, who have done ſo much honour to my former communications, if I did not, through the reſpectable canal of its worthy preſident, and my good friend, ſimply relate to them ſuch remarkable circumſtances as attended the late tremendous exploſions of Mount Veſuvius, and as either came immediately under my own inſpection, or have been related to me by ſuch good authority as cannot be called in queſtion.

Since the great eruption of 1767, of which I had the honour of giving a particular account to the Royal Society, Veſuvius has never been free from ſmoke, nor ever many months without throwing up red-hot ſcoriæ, which, increaſing to a certain degree, were uſually followed by a current of liquid lava, and except in the eruption of 1777, thoſe lavas broke out nearly from the ſame ſpot, and ran much in the ſame direction, as that of the famous eruption of 1767.

No leſs than nine ſuch eruptions are recorded here ſince the great one abovementioned, and ſome of them were conſiderable. I never failed viſiting thoſe lavas whilſt they were in full force, and as conſtantly examined them and the crater of the volcano after the ceaſing of each eruption [(b)].

It would be but a repetition of what has been deſcribed in my former letters on this ſubject, were I to relate my remarks on thoſe different expeditions. The lavas, when they either boiled over the crater, or broke out from the conical parts of the volcano, conſtantly formed channels as regular as if they had been cut by art down the ſteep part of the mountain, and, whilſt in a ſtate of perfect fuſion, continued their courſe in thoſe channels, which were ſometimes full to the brim, and at other times more or leſs ſo, according to the quantity of matter in motion.

Theſe channels, upon examination after an eruption, I have found to be in general from two to five or ſix feet

(b) The laſt viſit to the crater of Veſuvius, which was in the month of May, 1779, was my fifty-eighth, and to be ſure I have been four times as often on parts of the mountain, without climbing to its ſummit, and after all am not aſhamed to own, that I comprehend very little of the wonders I have ſeen in this great laboratory of nature; yet there have been naturaliſts of ſuch a wonderful penetrating genius, as to have thought themſelves ſufficiently qualified to account for every hidden phenomenon of Veſuvius, after having, literally ſpeaking, given the volcano *un coup d'œil.*

wide, and ſeven or eight feet deep. They were often hid from the ſight by a quantity of *ſcoriæ* that had formed a cruſt over them, and the lava having been conveyed in a covered way for ſome yards, came out freſh again into an open channel. After an eruption I have walked in ſome of thoſe ſubterraneous or covered galleries which were exceedingly curious, the ſides, top and bottom, being worn perfectly ſmooth and even in moſt parts by the violence of the currents of the red-hot lavas, which they had conveyed for many weeks ſucceſſively; in others, the lava had incruſted the ſides of thoſe channels with ſome very extraordinary *ſcoriæ:* beautifully ramified white ſalts [c], in the form of dropping ſtalactites, were alſo attached to many parts of the cieling of thoſe galleries. It is imagined here, that the ſalts of Veſuvius are chiefly ammoniac, though often tinged with green, deep, or pale yellow, by the vapour of various minerals.

In the month of May laſt, there was a conſiderable eruption of Mount Veſuvius, when I paſſed a night on the mountain in the company of one of my countrymen, as eager as myſelf in the purſuit of this branch of natural hiſtory [d].

(c) I ſent a large ſpecimen of this curious volcanic production to the Britiſh Muſeum laſt year.

(d) Mr. BOWDLER, of Bath.

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We ſaw the operation of the lava, in the channels as abovementioned, in the greateſt perfection; but it was, indeed, owing to our perſeverance, and ſome degree of reſolution. After the lava had quitted its regular channels, it ſpread itſelf in the valley, and, being loaded with *ſcoriæ*, ran gently on, like a river that had been frozen, and had maſſes of ice floating on it: the wind changing when we were cloſe to this gentle ſtream of lava, which might be about fifty or ſixty feet in breadth, incommoded us ſo much with its heat and ſmoke, that we muſt have returned without having ſatisfied our curioſity, had not our guide (e) propoſed the expedient of walking acroſs it, which, to our aſtoniſhment, he inſtantly put in execution, and with ſo little difficulty, that we followed him without heſitation, having felt no other inconveniency than what proceeded from the violence of the heat on our legs and feet; the cruſt of the lava was ſo tough, beſides being loaded with cinders and *ſcoriæ*, that our weight made not the leaſt impreſſion on it, and its motion was ſo ſlow, that we were not in any danger of loſing our balance and falling on it: however, this experiment ſhould not be tried except in caſes of real neceſſity; and I mention it with no other view than to point out a poſ-

(e) BARTOLOMEO, the Cyclops of Veſuvius, who has attended me on all my expeditions to the mountain, and who is an excellent guide.

ſibility

ſibility of eſcaping, ſhould any one hereafter, upon ſuch an expedition as ours, have the misfortune to be incloſed between two currents of lava.

Having thus got rid of the troubleſome heat and ſmoke, we coaſted the river of lava and its channels up to its very ſource, within a quarter of a mile of the crater. The liquid and red-hot matter bubbled up violently, with a hiſſing and crackling noiſe, like that which attends the playing off of an artificial firework, and by the continual ſplaſhing up of the vitrified matter, a kind of arch or dome was formed over the crevice from whence the lava iſſued. It was cracked in many parts, and appeared red-hot within, like an heated oven: this hollowed hillock might be about fifteen feet high, and the lava that ran from under it was received into a regular channel, raiſed upon a ſort of wall of *ſcoriæ* and cinders, almoſt perpendicularly, of about the height of eight or ten feet, reſembling much an ancient aqueduct.

We then went up to the crater of the volcano, in which we found, as uſual, a little mountain throwing *ſcoriæ* and red-hot matter with loud exploſions; but the ſmoke and ſmell of ſulphur was ſo intolerable, that we were under the neceſſity of quitting that curious ſpot with the utmoſt precipitation.

In

In another of my excurſions to Mount Veſuvius laſt year, I picked up ſome fragments of large and regular cryſtals of cloſe-grained lava or baſalt, the diameter of which, when the priſms were complete, may have been eight or nine inches. As Veſuvius does not exhibit any lava's regularly cryſtallized, and forming what are vulgarly called Giants Cauſeways (except a lava that ran into the ſea near Torre del Greco in 1631, and which in a ſmall degree has ſuch an appearance), this diſcovery gave me the greateſt pleaſure [f].

After this ſlight ſketch of the moſt remarkable events on Veſuvius ſince the year 1767, which I flatter myſelf will not be unacceptable, as it may ſerve to connect what I am going to relate with what has already been communicated to the Society in my former letters on the ſame ſubject, I come to the account of the late eruption, which affords indeed ample matter for curious ſpeculation.

(*f*) As the fragments of baſalt columns, which I found on the cone of Veſuvius, had been evidently thrown out of its crater, may not lava be more ſubject to cryſtallize within the bowels of a volcano than after its emiſſion, and having been expoſed to the open air? And may not many of the Giants Cauſeways, already diſcovered, be the *nuclei* of volcanic mountains, whoſe lighter and leſs ſolid parts may have been worn away by the hand of time? Mr. FAUJEIS DE ST. FOND, in his curious book lately publiſhed, and intitled, "Re-"cherches ſur les Volcains éteints du Vivarais et du Velay," gives (p. 286.) an example of baſalt columns, that are placed deep within the crater of an extinguiſhed volcano.

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As many poetical deſcriptions of this eruption will not be wanting, I ſhall confine mine to ſimple matter of fact in plain proſe, and endeavour to convey to you, SIR, as clearly and as diſtinctly as I am able, what I ſaw myſelf, and the impreſſion it made upon me at the time, without aiming in the leaſt at a flowery ſtyle.

The uſual ſymptoms of an approaching eruption, ſuch as rumbling noiſes and exploſions within the bowels of the volcano, a quantity of ſmoke iſſuing with force from its crater, accompanied at times with an emiſſion of red-hot *ſcoriæ* and aſhes, were manifeſt, more or leſs, during the whole month of July; and towards the end of the month, thoſe ſymptoms were increaſed to ſuch a degree as to exhibit in the night-time the moſt beautiful fire-works that can be imagined.

Theſe kinds of throws of red-hot *ſcoriæ* and other volcanic matter, which at night are ſo bright and luminous, appear in broad day-light like ſo many black ſpots in the midſt of the white ſmoke; and it is this circumſtance that occaſions the vulgar and falſe ſuppoſition, that volcanos burn much more violently at night than in the day-time.

On Thurſday, the 5th of Auguſt laſt, about two o'clock in the afternoon, I perceived from my villa at Pauſilipo in the bay of Naples, from whence I have a

full view of Veſuvius (which is juſt oppoſite, and at the diſtance of about ſix miles in a direct line from it) that the volcano was in a moſt violent agitation: a white and ſulphureous ſmoke iſſued continually and impetuouſly from its crater, one puff impelling another, and by an accumulation of thoſe, clouds of ſmoke reſembling bales of the whiteſt cotton. Such a maſs of them was ſoon piled over the top of the volcano as exceeded the height and ſize of the mountain itſelf at leaſt four times. In the midſt of this very white ſmoke, an immenſe quantity of ſtones, *ſcoriæ*, and aſhes, were ſhot up to a wonderful height, certainly not leſs than two thouſand feet. I could alſo perceive, by the help of one of RAMSDEN'S moſt excellent refracting teleſcopes, at times, a quantity of liquid lava, ſeemingly very weighty, juſt heaved up high enough to clear the rim of the crater, and then take its courſe impetuouſly down the ſteep ſide of Veſuvius, oppoſite to Somma. Soon after a lava broke out on the ſame ſide from about the middle of the conical part of the volcano, and, having run with violence ſome hours, ceaſed ſuddenly, juſt before it had arrived at the cultivated parts of the mountain above Portici, near four miles from the ſpot where it iſſued.

During this day's eruption, as I have been credibly informed ſince, the heat was intolerable at the towns of

Somma and Ottaiano; and was likewiſe ſenſibly felt at Palma and Lauro, which are much farther from Veſuvius than the former. Minute aſhes, of a reddiſh hue, fell ſo thick at Somma and Ottaiano, that they darkened the air in ſuch a manner as that objects could not be diſtinguiſhed at the diſtance of ten feet. Long filaments of a vitrified matter like ſpun-glaſs were mixed and fell with theſe aſhes (g); and the ſulphureous ſmoke was ſo violent, that ſeveral birds in cages were ſuffocated, the leaves of the trees in the neighbourhood of Somma and Ottaiano were covered with white ſalts very corroſive. About two o'clock in the afternoon, an extraordinary globe of ſmoke, of a very great diameter, was diſtinctly perceived, by many of the inhabitants of Portici, to iſſue from the crater of Veſuvius, and proceed haſtily towards the mountain of Somma, againſt which it ſtruck and diſperſed itſelf, having left a train of white ſmoke, mark-

(g) During an eruption of the volcano in the iſle of Bourbon in 1766, ſome miles of country, at the diſtance of ſix leagues from that volcano, were covered with a flexible, capillary, yellow glaſs, ſome of which were two or three feet long, with ſmall vitrous globules at a little diſtance one from the other. Count BUFFON ſhewed me ſome of this capillary and flexible glaſs, which is preſerved in the Royal Muſeum at Paris, and which perfectly reſembles the filaments of vitrified matter which fell at Ottaiano and in other parts on the borders of Veſuvius during this eruption. SORRENTINO, in his Iſtoria del Veſuvio, publiſhed at Naples in 1734, likewiſe mentions vitrified matter, like herbs and ſtraw, being found on the ground in the neighbourhood of Veſuvius during an eruption of that mountain in the year 1724.

ing the courſe it had taken: this train I perceived plainly from my villa, as it laſted ſome minutes; but I did not ſee the globe itſelf.

A poor labourer, who was making faggots on the mountain of Somma, loſt his life at this time, and his body not having been found, it is ſuppoſed that, ſuffocated by the ſmoke, he muſt have fallen into the valley from the craggy rocks on which he was at work, and been covered by the current of lava that took its courſe through that valley ſoon after. An aſs, that was waiting for its maſter in the valley, left it very judiciouſly as ſoon as the mountain became violent, and, arriving ſafe home, gave the firſt alarm to this poor man's family.

It was generally remarked, that the exploſions of the volcano were attended with more noiſe during this day's eruption than in any of the ſucceeding ones, when, moſt probably, the mouth of Veſuvius was widened, and the volcanic matter had a freer paſſage. It is certain, however, that the great eruption of 1767 (which in every other reſpect was mild, when compared to the late violent eruption) occaſioned much greater concuſſions in the air by its louder exploſions.

Friday, Auguſt the 6th, the fermentation in the mountain was leſs violent; but, about noon, there was a loud report, at which time it was ſuppoſed, that a portion

of

of the little mountain within the crater had fallen in. At night the throws from the crater increaſed, and proceeded evidently from two ſeparate mouths, which emitting red-hot *ſcoriæ*, and in different directions, formed a moſt beautiful and almoſt continued fire-work.

On Saturday, Auguſt the 7th, the volcano remained much in the ſame ſtate; but, about twelve o'clock at night, its fermentation increaſed greatly. The ſecond fever-fit of the mountain may be ſaid to have manifeſted itſelf at this time. I was watching its motions from the mole of Naples, which has a full view of the volcano, and had been witneſs to ſeveral glorious picturesque effects produced by the reflection of the deep red fire, which iſſued from the crater of Veſuvius, and mounted up in the midſt of the huge clouds, when a ſummer ſtorm, called here *a tropea*, came on ſuddenly, and blended its heavy watry clouds with the ſulphureous and mineral ones, which were already like ſo many other mountains, piled over the ſummit of the volcano; at this moment a fountain of fire was ſhot up to an incredible height, caſting ſo bright a light, that the ſmalleſt objects could be clearly diſtinguiſhed at any place within ſix miles or more of Veſuvius.

The black ſtormy clouds paſſing ſwiftly over, and at times covering the whole or a part of, the bright column

of

of fire, at other times clearing away, and giving a full view of it, with the various tints produced by its reverberated light on the white clouds above, in contraſt with the pale flaſhes of forked lightning that attended the *tropea*, formed ſuch a ſcene as no power of art can ever expreſs.

That which followed the next evening was ſurely much more formidable and alarming; but this was more beautiful and ſublime than even the moſt lively imagination can paint to itſelf. This great exploſion did not laſt above eight or ten minutes, after which Veſuvius was totally eclipſed by the dark clouds, and there fell a heavy ſhower of rain.

Some *ſcoriæ* and ſmall ſtones fell at Ottaiano during this eruption, and ſome of a very great ſize in the valley between Veſuvius and the Hermitage. All the inhabitants of the towns at the foot of the volcano were in the greateſt alarm, and preparing to abandon their houſes, had the eruption continued longer.

One of his Sicilian Majeſty's game-keepers, who was out in the fields near Ottaiano, whilſt this combined ſtorm was at its height, was greatly ſurprized to find the drops of rain ſcald his face and hands, which phenomenon was probably occaſioned by the clouds having acquired a great degree of heat in paſſing through the

above

above mentioned column of fire. The King of Naples did me the honour of informing me of this curious circumſtance.

Sunday, Auguſt the 8th, Veſuvius was quiet till towards ſix o'clock in the evening, when a great ſmoke began to gather again over its crater, and about an hour after, a rumbling ſubteranneous noiſe was heard in the neighbourhood of the volcano; the uſual throws of red-hot ſtones and *ſcoriæ* began, and increaſed every inſtant. I was at this time at Pauſilipo, in the company of ſeveral of my countrymen, obſerving with good teleſcopes the curious phenomena in the crater of Veſuvius, which, with ſuch help, we could diſtinguiſh as well as if we had been actually ſeated on the ſummit of the volcano. The crater ſeemed much enlarged by the violence of laſt night's exploſions, and the little mountain no longer exiſted. At about nine o'clock there was a loud report, which ſhook the houſes at Portici and its neighbourhood to ſuch a degree as to alarm their inhabitants, and drive them out into the ſtreets; and, as I have ſince ſeen, many windows were broken, and walls cracked, by the concuſſion of the air from that exploſion, though faintly heard at Naples.

In an inſtant a fountain of liquid tranſparent fire began to riſe, and, gradually increaſing, arrived at ſo amazing a height

a height as to ſtrike every one who beheld it with the moſt awful aſtoniſhment. I ſhall ſcarcely be credited when I aſſure you, SIR, that, to the beſt of my judgment, the height of this ſtupendous column of fire could not be leſs than three times that of Veſuvius itſelf, which, as you know, riſes perpendicularly near 3700 feet above the level of the ſea [(h)].

Puffs of ſmoke, as black as can poſſibly be imagined, ſucceeded one another haſtily, and accompanied the red-hot, tranſparent, and liquid lava, interrupting its ſplendid brightneſs here and there by patches of the darkeſt hue. Within theſe puffs of ſmoke, at the very moment of their emiſſion from the crater, I could perceive a bright, but pale, electrical fire, briskly playing about in zig zag lines [(i)].

The wind was S.W.; and though gentle was ſufficient to carry theſe detached clouds or puffs of ſmoke out of the column of fire, and a collection of them, by degrees, formed a black and extenſive curtain (if I may be al-

(*h*) Se tu ſe' or lettore, a creder lento
Ció, ch'e Io dirò, non ſarà maraviglia;
Che Io, che l' vidi; appena il mi conſento.

DANTE INF. Cant. XXV. verſo 46.

(*i*) I mention this circumſtance to prove, that the electrical matter, ſo manifeſt during this eruption, actually proceeded from the bowels of the volcano, and was not attracted from a great height in the air, and conducted into its crater by the vaſt column of ſmoke.

lowed the expreſſion) behind it; in other parts of the ſky it was perfectly clear, and the ſtars were bright.

The fiery fountain, of ſo gigantic a ſize, upon the dark ground above mentioned, made the moſt glorious contraſt imaginable, and the blaze of it reflected ſtrongly on the ſurface of the ſea, which was at that time perfectly ſmooth, added greatly to this ſublime view.

The liquid lava, mixed with ſtones and *ſcoriæ*, after having mounted, I verily believe, at the leaſt ten thouſand feet, was partly directed by the wind towards Ottaiano, and partly falling almoſt perpendicularly, ſtill red-hot and liquid, on Veſuvius, covered its whole cone, part of that of the mountain of Somma, and the valley between them. The falling matter being nearly as vivid and inflamed as that which was continually iſſuing freſh from the crater, formed with it one complete body of fire, which could not be leſs than two miles and a half in breadth, and of the extraordinary height above mentioned, caſting a heat to the diſtance of at leaſt ſix miles around it.

The bruſh wood on the mountain of Somma was ſoon in a blaze, which flame, being of a different tint from the deep red of the matter thrown out of the volcano, and from the ſilvery blue of the electrical fire, ſtill added to the contraſt of this moſt extraordinary ſcene.

The black cloud increaſing greatly once bent towards Naples, and ſeemed to threaten this fair city with ſpeedy deſtruction; for it was charged with electrical matter, which kept conſtantly darting about it in ſtrong and bright zig zags, juſt like thoſe deſcribed by PLINY the younger in his letter to TACITUS, and which accompanied the great eruption of Veſuvius that proved fatal to his uncle [k]. This volcanic lightning, however, as I particularly remarked, very rarely quitted the cloud, but uſually returned to the great column of fire towards the crater of the volcano from whence it originally came [l]. Once or twice, indeed, I ſaw this lightning (or *ferilli* as it is called here) fall on the top of Somma, and ſet fire to ſome dry graſs and buſhes [m].

Fortunately

(k) "Ab altero latere, nubes atra, et horrenda, ignei ſpiritus tortis vi "bratiſque diſcurſibus rupta, in longas flammarum figuras dehiſcebat; fulgoribus "illæ, et ſimiles et majores." PLIN. Epiſt.

(l) SORRENTINO mentions the like obſervation, which he made during an eruption of Veſuvius in 1707, when the ſame kind of black cloud bent over Naples; theſe are his words. "Alle ore 19. tutti i cittadini nelle oſcure tenebre "ſi trovarono in mezzo delle Saëtte, delle quali, alcune vedeanſi uſcir dalla for-"nace del Veſuvio, e ſcorrere ſino al capo di Paufilipo, d'onde non paſſando "più inanzi fuor la nuvola delle ceneri, o divertirſi altronde, indietro per "l'iſteſſa linea tornarono a ſcopiar ſu la fornace, onde uſcirono: qual moto re-"trogrado mai hopotuto intendere."

(m) Some time after the eruption had ceaſed, the air continued greatly impregnated with electrical matter. The Duke of Cotrofiano, a Neapolitan nobleman (who, from his ſuperior knowledge in experimental philoſophy and

Fortunately for us the wind increaſing from the S.W. quarter, carried back the threatning cloud juſt as it had reached the city, and began to occaſion great alarm. All public diverſions ceaſed in an inſtant, and the theatres being ſhut, the doors of the churches were thrown open. Numerous proceſſions were formed in the ſtreets, and women and children, with diſhevelled heads, filled the air with their cries, inſiſting loudly upon the relics of St. Januarius being immediately oppoſed to the fury of the mountain: in ſhort, the populace of this great city began to diſplay its uſual extravagant mixture of riot and bigotry, and if ſome ſpeedy and well-timed precautions had not been taken, Naples would, perhaps, have been in more danger of ſuffering from the irregularities of its lower claſs of inhabitants than from the angry volcano.

But to return to my ſubject: after the column of fire had continued in full force near half an hour, the eruption ceaſed all at once, and Veſuvius remained ſullen and ſilent. After the dazzling light of the fiery fountain [n],

mechanics, does honour to his country) told me, that having, about half an hour after the great eruption had ceaſed, held a Leyden bottle, armed with a pointed wire, out of his window at Naples, it ſoon became conſiderably charged. Whilſt the eruption was in force, its appearance was too alarming to allow one to think of ſuch experiments.

(n) The light diffuſed by this huge column of fire was ſo ſtrong, that the moſt minute objects could be diſcerned clearly within the compaſs of ten miles or more round the mountain. Mr. MORRIS, an Engliſh gentleman, told me, that at Sorrento, which is twelve miles from Veſuvius, he read the title page of a book by that volcanic light.

all ſeemed dark and diſmal, except the cone of Veſuvius, which was covered with glowing cinders and *ſcoriæ*, from under which, at times, here and there, ſmall ſtreams of liquid lava eſcaped, and rolled down the ſteep ſides of the volcano. This ſcene put me in mind of MARTIAL'S deſcription of Etna:

Cuncta jacent flammis, et triſti merſa favillâ.

In the parts of Naples neareſt Veſuvius, whilſt the eruption laſted, a mixed ſmell, like that of ſulphur, with the vapours of an iron foundery, was ſenſible; but nearer to the mountain that ſmell was very offenſive, as I have often found it in my viſits to Veſuvius during an eruption.

Thus, SIR, have I endeavoured to convey to you at leaſt a faint idea of a ſcene ſo glorious and ſublime as, perhaps, may have never before been viewed by human eyes, at leaſt in ſuch perfection.

I am ſenſible, from the traces of them I have obſerved in the volcanic ſtrata, which compoſe the greateſt part of this country, that there have been many more conſiderable eruptions than the one juſt deſcribed; yet, moſt probably, thoſe very violent eruptions muſt either have been attended with earthquakes, and other ſuch alarming circumſtances, as to make the beholders leſs attentive to the beauty of the ſcenes ſuch phenomena offered than to their

their own ſafety; or clouds of ſmoke and aſhes, as is uſually the caſe in all great eruptions, muſt have ſo far obſcured the volcano, as to exhibit only a confuſed maſs of fire and ſmoke.

Whilſt we had been enjoying the extraordinary ſight of this gigantic fountain of liquid fire in perfect ſafety, the unfortunate inhabitants of the other ſide of the mountain of Somma, particularly at Ottaiano and Cacciabella, were involved in that dark and ſooty cloud which formed ſo proper a back ground to our bright picture, and were pelted with ſtones and *ſcoriæ* of lava; but I ſhall preſently give you a particular deſcription of their truly diſtreſsful ſituations, juſt as I had it from many of the poor ſufferers themſelves, when I viſited that part of the country a few days after this eruption.

Monday, Auguſt the 9th, about nine o'clock in the morning, the fourth fever-fit of the mountain began to manifeſt itſelf by the uſual ſymptoms, ſuch as a ſubterraneous boiling noiſe, violent exploſions of inflamed matter from the crater of the volcano, accompanied with ſmoke and aſhes, which ſymptoms increaſed every inſtant. The ſmoke was of two ſorts; the one as white as ſnow, and the other as black as jet.

The white, as deſcribed in the former part of this journal, rolled gently maſs over maſs, reſembling bales

of

of the ſofteſt cotton; and the black compoſed of *ſcoriæ* and minute aſhes ſhot up with force in the midſt of the white ſmoke, which, from the minerals, was alſo ſometimes tinged with yellow, blue, and green. Preſently ſuch a tremenduous maſs of theſe accumulated clouds ſtood over Veſuvius as ſeemed to threaten Naples again, and actually made the mountain itſelf appear a mole-hill.

This day's eruption was ſimilar to that of Thurſday laſt, but many degrees more violent. Some ſtones, thrown near as high as thoſe of laſt night, fell on the mountain of Somma, and ſet fire to the bruſh wood with which it is covered; but there being little wind, and that Weſterly, the volcanic matter roſe and fell in a more perpendicular direction, and Ottaiano did not ſuffer by this day's eruption; but moſt of the inhabitants of the towns, on the borders of Veſuvius, fled to Naples, alarmed by the tremendous clouds and the loud exploſions.

We remarked, that ſeveral very large ſtones, after having mounted to an immenſe height, formed a parabola, leaving behind them a trace of white ſmoke that marked their courſe; ſome burſt in the air exactly like bombs, and others fell into the valley between Somma and Veſuvius without burſting; others again burſt into a thou-

a thouſand pieces ſoon after their emiſſion from the crater: they might very properly be called volcanic bombs.

In the ſmoke iſſuing from the crater of Veſuvius we often remarked a ſudden briſk and quivering motion, which ſeemed to communicate itſelf inſtantaneouſly from one cloud to another, and ſometimes affected thoſe that were very high in the great maſs above the volcano. Though I could not diſcern any electrical fire, yet I make no doubt, but that the effect above mentioned was occaſioned by it, and would have been viſible in the night-time.

Upon the whole, this day's eruption was very alarming; until the lava broke out about two o'clock, and ran three miles between the two mountains, we were in continual apprehenſion of ſome fatal event. It continued to run about three hours, during which time every other ſymptom of the mountain fever gradually abated, and at ſeven o'clock at night all was calm.

It was univerſally remarked, that the air this night, for many hours after the eruption, was filled with meteors, ſuch as are vulgarly called falling ſtars; they ſhot generally in an horizontal direction, leaving a luminous trace behind them, but which quickly diſappeared. The night was remarkably fine, ſtar-light, and without a cloud. This kind of electrical fire ſeemed to be harmleſs,

leſs, and never to reach the ground; whereas that with which the black volcanic cloud of laſt night was pregnant appeared miſchievous, like the lightning that attends a ſevere thunder ſtorm, as we ſhould undoubtedly have experienced, had the eruption continued longer, and the cloud ſpread over Naples. The ſame kind of lightning proved fatal to ſeveral people, and did great damage within the ſpace of many miles round Veſuvius during its great eruption of 1631, as is mentioned in one of my former letters on this ſubject.

During this day's eruption the relics of St. Januarius were carried in proceſſion, and expoſed to the furious mountain from the bridge of the Maddalena, amidſt a prodigious concourſe of people, who are at this moment well convinced, that to this ceremony alone Naples may attribute its happy eſcape.

It was from their Sicilian Majeſties palace at Pauſilipo that I made my obſervations on this day's eruption, and in the preſence of their Majeſties, who had been pleaſed to ſend for me in the morning, as ſoon as the volcano became turbulent.

Tueſday, Auguſt the 10th, Veſuvius was quiet.

Wedneſday, Auguſt the 11th, about ſix o'clock in the morning, the fifth and laſt fever-fit of the mountain came on, and gradually increaſed. About twelve o'clock

it

it was at its height (o), and very violent indeed, the explo-ſions being louder than thoſe that attended the former eruptions, we could not judge of the height of the vol-lies of ſtones and *ſcoriæ*, as ſome rainy clouds were blended with the volcanic ones, and hid the upper part of the cone and crater of Veſuvius from our view.

The ſame mountains of white cotton-like clouds, piled one over another, roſe to ſuch an extraordinary height, and formed ſuch a coloſſal maſs over Veſuvius, as cannot poſſibly be deſcribed, or ſcarcely imagined. It may have been from a ſcene of this kind, that the ancient poets took their ideas of the giants waging war with Jupiter.

About five o'clock in the evening the eruption ceaſed, ſome rain having fallen this day, which having been greatly impregnated with the corroſive ſalts of the vol-cano, did much damage to the vines in its neighbour-hood.

Thurſday and Friday, the 12th and 13th of Auguſt, Veſuvius continued to ſmoke conſiderably, and at times ſlight exploſions were heard, like cannon at a great diſ-tance; but there have been no more throws from its cra-

(o) It has been remarked by the oldeſt people in the neighbourhood of Veſu-vius, that in its eruptions the volcano is ſubject to a criſis at noon and midnight; and, indeed, from my own obſervation, I believe that remark to be well-founded.

ter, nor any ſtreams of lava from its flanks, ſince Wedneſday laſt.

On Saturday, Auguſt the 15th, I went, accompanied by Count LAMBERG, the Imperial Miniſter at this Court, to viſit Ottaiano and Cactia-bella, the diſtrict which had been moſt ſeverely treated by the heavy and deſtructive ſhower of volcanic matter from the crater of Veſuvius laſt Sunday night.

Soon after having paſſed the town of Somma, we began to perceive, that the heat of the fiery ſhower, which had fallen in its neighbourhood, had affected the leaves of the trees and vines, which we found ſtill more parched and ſhrivelled in proportion as we approached the town of Ottaiano, which may be about three miles from Somma. At about the diſtance of a mile from Somma, we began to perceive freſh cinders or *ſcoriæ* of lava, thinly ſcattered on the road and in the fields. Every ſtep we advanced we found them of a larger dimenſion, and in greater abundance. At the diſtance of a mile and a half from Ottaiano, the ſoil was totally covered by them, and the leaves and fruit were either intirely ſtripped from the trees, or remained thinly on them, ſhrivelled and dried up by the intenſe heat of the volcanic ſhower.

After having paſſed through the moſt fertile country, abounding with trees loaded with fruits of every kind, and the moſt luxuriant vegetation, through gay villages crouded with chearful inhabitants, to come at once to ſuch a ſcene of deſolation and miſery, affording to our view nothing but heaps of black cinders and aſhes, blaſted trees, ruined houſes, with a few of their ſcattered inhabitants juſt returned with ghaſtly, diſmayed countenances, to ſurvey the havock done to their tenements and habitations, and from which they themſelves had with much difficulty eſcaped alive on Sunday laſt, was ſuch a melancholy ſcene as can neither be deſcribed or forgotten.

We found the roof of his Sicilian Majeſty's ſporting ſeat at Caccia-bella much damaged by the fall of large ſtones and heavy *ſcoriæ*, ſome of which, after having been broken by their fall through the roof, ſtill weighed upwards of thirty pounds. This place, in a direct line, cannot be leſs than four miles from the crater of Veſuvius.

The moſt authentic accounts have been received of the fall of ſmall volcanic ſtones and cinders (ſome of which weighed two ounces) at Benevento, Foggia, and Monte Mileto, upwards of thirty miles from Veſu-

vius [p]; but what is moſt extraordinary (as there was but little wind during the eruption of the eighth of Auguſt) minute aſhes fell thick that very night upon the town of Manfredonia, which is at the diſtance of an hundred miles from Veſuvius [q].

Theſe facts ſeem to confirm the extreme ſuppoſed height of the column of fire that iſſued from the crater of Veſuvius laſt Sunday night, and are greatly in ſupport of what we find recorded in the hiſtory of Veſuvius with reſpect to the fall of its aſhes at an amazing diſtance, and in a ſhort ſpace of time, during its violent eruptions.

We proceeeded from Caccia-bella to Ottaiano, which is a mile nearer to Veſuvius, and is reckoned to contain twelve thouſand inhabitants. Nothing could be more diſmal than the ſight of this town, unroofed, half buried

(p) The prince of Monte Mileto told me, that his ſon, the Duke of Popoli, who was at Monte Mileto the 8th of Auguſt, had been alarmed by the ſhower of cinders that fell there, ſome of which he had ſent to Naples, weighing two ounces; and that ſtones of an ounce had fallen upon an eſtate of his ten miles farther off. Monte Mileto is about thirty miles from the volcano.

(q) The Abbé GALIANI, well known in the literary world, told me, that his ſiſter, a nun in a Convent at Manfredonia, had wrote to enquire after him, imagining that Naples muſt have been deſtroyed, when they, at ſo great a diſtance, had been ſo much alarmed by a ſhower of minute aſhes, which fell on that city at eleven o'clock at night, the 8th of Auguſt, as to open all the churches, and go to prayers. As the great eruption happened at nine o'clock at night, the aſhes muſt have travelled an hundred miles within the ſhort ſpace of two hours.

under

under black *ſcoriæ* and aſhes, all the windows towards the mountain broken, and ſome of the houſes themſelves burnt, the ſtreets choaked up with theſe aſhes (in ſome that were narrow, the *ſtratum* was not leſs than four feet thick), and a few of the inhabitants juſt returned were employed in clearing them away, and piling up the aſhes in hillocks to get at their ruined houſes. Others were aſſembled in little groups, inquiring after their friends and neighbours, relating each other's woes, croſſing themſelves, and lifting up their eyes to Heaven when they mentioned their miraculous eſcapes. Some monks, who were in their convent during the whole of the horrid ſhower, gave us the following particulars, which they related with ſolemnity and preciſion.

The mountain of Somma, at the foot of which Ottaiano is ſituated, hides Veſuvius from its ſight, ſo that till the eruption became conſiderable it was not viſible to them. On Sunday night, when the noiſe increaſed, and the fire began to appear above the mountain of Somma, many of the inhabitants of this town flew to the churches, and others were preparing to quit the town, when a ſudden violent report was heard; ſoon after which they found themſelves involved in a thick cloud of ſmoke and minute aſhes: a horrid claſhing noiſe was heard in the air, and preſently fell a deluge of ſtones and

large

large *ſcoriæ*, ſome of which *ſcoriæ* were of the diameter of ſeven or eight feet, and muſt have weighed more than an hundred pounds before they were broken by their fall, as ſome of the fragments of them, which I picked up in the ſtreets, ſtill weighed upwards of ſixty pounds. When theſe large vitrified maſſes either ſtruck againſt one another in the air, or fell on the ground, they broke in many pieces, and covered a large ſpace around them with vivid ſparks of fire, which communicated their heat to every thing that was combuſtible (r). In an inſtant the town, and country about it, was on fire in many parts; for in the vineyards there were ſeveral ſtraw huts, which had been erected for the watchmen of the grapes, all of which were burnt. A great magazine of wood in the heart of the town was all in a blaze, and, had there been much wind, the flames muſt have ſpread univerſally, and all the inhabitants would have infallibly been burnt in their houſes, for it was impoſſible for them to ſtir out. Some who attempted it with pillows, tables, chairs, the tops of wine caſks, &c. on their heads, were either knocked down, or ſoon driven back to their cloſe quarters under arches, and in the cellars of their houſes. Many

(r) Theſe maſſes were formed of the liquid lava, the exterior parts of which had become black and porous by cooling in the long traverſe they had made through the air, whilſt the interior parts, leſs expoſed, retained an extreme heat, and were perfectly red.

were

were wounded, but only two perſons have died of the wounds they received from this dreadful volcanic ſhower. To add to the horror of the ſcene, inceſſant volcanic lightning was whiſking about the black cloud that ſurrounded them, and the ſulphureous ſmell and heat would ſcarcely allow them to draw their breath.

In this miſerable and alarming ſituation they remained about twenty-five minutes, when the volcanic ſtorm ceaſed all at once, and the frightened inhabitants of Ottaiano, apprehending a freſh attack from the turbulent mountain, haſtily quitted the country, after having depoſited the ſick and bed-ridden, at their own deſire, in the churches.

Had the eruption laſted an hour longer, Ottaiano muſt have remained exactly in the ſtate of Pompeia, which was buried under the aſhes of Veſuvius juſt 1700 years ago, with moſt of its inhabitants, whoſe bones are to this day frequently found under arches and in the cellars of the houſes of that ancient city.

We were told of many miracles that had been wrought by the images of ſaints at this place during the late diſaſter; but, as they are quite foreign to my purpoſe, I ſhall, as uſual, paſs them over in ſilence.

The palace of the Prince of Ottaiano is ſituated on an eminence above the town, and nearer the mountain, the

ſteps

ſteps leading up to it, being deeply covered with volcanic matter, reſembled the cone of Veſuvius, and the white marble ſtatues on the baluſtrade made a ſingular appearance peeping from under the black aſhes, which had entirely covered both the baluſtrade and their pedeſtals. The roof of the palace was totally deſtroyed, and the windows were broken; but the houſe itſelf, being ſtrongly built, had not ſuffered much.

We had an opportunity of ſeeing here exactly the quality of the dreadful ſhower, as the volcanic matter, which broke through the roof of the palace, and fell into the garrets on the balconies and in the courts, had not been removed. It was compoſed of the *ſcoriæ* of freſh lava much vitrified, great and ſmall, mixed with fragments of ancient ſolid lavas of different ſorts: many pieces were enveloped by the new lava, which formed a cruſt about them; and others were only ſlightly varniſhed by the freſh lava. Theſe kind of ſtones being very compact, and ſome weighing eight or ten pounds, muſt have fallen with greater force than the heavier *ſcoriæ*, which were very porous, and had the great ſurface above mentioned.

The palace of Ottaiano is built on a thick *ſtratum* of ancient lava, which ran from the mountain of Somma when in its active volcanic ſtate. Under this *ſtratum* we were

were ſhewn three grottoes, from which iſſues a conſtant extreme cold wind, and at times with impetuoſity, and a noiſe like water daſhing upon rocks. They are ſhut up with doors like cellars, and are made uſe of as ſuch, as alſo to keep proviſions freſh and to cool liquors. I had never ſeen theſe *ventaroli* before. In my letter to Dr. MATY, upon the nature of the ſoil round Naples, I have mentioned others of the ſame kind that I had met with on Veſuvius, Etna, and in the Iſland of Iſchia (*s*).

We obſerved, that the tract of country completely covered with a *ſtratum* of the volcanic matter above mentioned was about two miles and a half broad, and as much in length, in which ſpace the vines and fruit trees were totally ſtripped of their leaves and fruit, and had the appearance of being quite burnt up; but, to my great ſurprize, having viſited that country again two days ago, I ſaw thoſe very trees, which were apple, pear, peach, and apricot, in bloſſom again, and ſome with the fruit already formed, and of the ſize of hazel-nuts. The vines there had alſo put forth freſh leaves, and were in

(*s*) At Ceſi, in the Roman State, towards the Adriatic, there are many ſuch *ventaroli*; and the inhabitants of that town, by means of leaden pipes, conduct the freſh air from them into the very rooms of their houſes, ſo that by turning a cock they can cool them to any degree. Some who have refined ſtill more upon this luxury, by ſmaller pipes, bring this cold air under the dining-table, ſo as to cool the bottle of liquor upon it.

bloom. Many foxes, hares, and other game, were deſtroyed by the fiery ſhower in the diſtrict of Somma and Ottaiano (t)

His Sicilian Majeſty, whoſe goodneſs of heart inclines him on all occaſions to ſhew his benevolence and aſſiſt the unfortunate, has ordered a conſiderable ſum of money to be diſtributed among the unhappy ſufferers of Ottaiano and its neighbourhood.

On the 18th of September I went upon Mount Veſuvius, accompanied by Lord HERBERT and my uſual guide. We could not poſſibly reach its crater, being covered with a thick ſmoke, too ſulphureous and offenſive to be encountered; neither would it have been prudent to have ventured up, had there not been that impediment, as it was evident, from the loud reports we heard from time to time, that there exiſted ſtill a great fermentation within the bowels of the volcano. We therefore contented ourſelves with examining the effects of the late extraordinary eruption on its cone, and in the valley between it and the mountain of Somma.

The conical part of Veſuvius is now covered with fragments of lava and *ſcoriæ*, which makes the aſcent

(t) Having had the honour of being on a ſhooting party lately with the King of Naples, at the foot of Veſuvius and Somma, ſeveral dead hares were found, and we killed others whoſe backs were quite bare, the fur having been ſinged off of them by the hot aſhes.

much

much more difficult and troubleſome than when it was only covered with minute aſhes. The particularity of this laſt eruption was, that the lava which uſually ran out of the flanks of the volcano, forming caſcades, rivers, and rivulets of liquid fire, was now chiefly thrown up from its crater in the form of a gigantic fountain of fire [u], which falling ſtill in ſome degree of fuſion has, in a manner,

(u) SORRENTINO mentions, in his Iſtoria del Veſuvio, that the volcano in 1676 vented itſelf in the like manner. " Non a torrenti modo mandò fuori le " ſue viſcere, ma tutti in aria menòlla." Such wonderful, violent, and ſudden emiſſions of liquid lava muſt have been occaſioned by ſome accidental and extraordinary cauſe; and I was inclined to think, that a ſudden communication of water with the lava in fuſion might be the occaſion of ſuch a phenomenon, particularly as we know that pools of rain-water have been found formerly in caverns within the bowels of Veſuvius; and that a river, ſuppoſed to be that anciently called Draco, and which was buried by an ancient eruption, burſt out ſome years ago with ſuch force, from under a *ſtratum* of lava at Torre del Greco, as to be ſufficient to turn mills there; but a late curious experiment, mentioned by Monſ. DE FAUJAS, in his Recherches ſur les Volcans éteints, p. 176. ſeems to contradict my ſuppoſition; and that water introduced to the furnace of a volcano, finding there a more rarified air, would not produce an exploſion. Monſ. DESLAUDES, Director of the Royal Manufacture of Looking-glaſs at St. Gobin, made the following experiment in 1768, in the preſence of the Duke DE LA ROCHEFOUCAULT, Monſ. DE FAUJAS, and others. He poured ſome water upon a quantity of glaſs in fuſion, and which had been in that ſtate in the crucible for twelve hours. The water did not occaſion the leaſt fermentation; but, on the contrary, rolled upon its ſurface, without even producing any ſmoke, and after having become ſeemingly red-hot, like the metal in fuſion, diſappeared in about three minutes, without having occaſioned the leaſt exploſion. If the great emiſſions of lava above mentioned were not then occaſioned by water mixing with the lava, may not they have been produced by violent

a manner, caſed up the conical part of Veſuvius with a *ſtratum* of hard *ſcoriæ:* on the ſide next the mountain of Somma, that *ſtratum* is ſurely more than one hundred feet thick, forming a high ridge. The valley between Veſuvius and Somma has received ſuch a prodigious quantity of lava and other volcanic matter during this laſt eruption, that it is raiſed, as is imagined, two hundred and fifty feet or more. Three ſuch eruptions as the laſt would completely fill up the valley, and, by uniting Veſuvius and Somma, form them into one mountain, as they moſt probably were before the great eruption in the reign of TITUS. In ſhort, I found the whole face of Veſuvius changed. Thoſe curious channels, in which the lava ran in the month of May laſt, are all buried. The volcano appears to have likewiſe increaſed in height; the form of the crater is changed, a great piece of its rim towards Somma being wanting; and on the ſide towards the ſea it is alſo broken. There are ſome very large cracks towards the point of the cone of the volcano, which makes it probable, that more of the borders of the crater will fall in. The ridge of freſh volcanic matter on the cone of Veſuvius towards Somma, and the thick *ſtratum* in the valley, are likewiſe

ſubterraneous exhalations having forced their way into the cauldron of the volcano (if I may be allowed the expreſſion) replete with matter in fuſion, and blown its whole contents, with what even oppoſed its paſſage, at once into the air?

full

full of cracks, from which there iſſues a conſtant ſulphureous ſmoke that tinges them and the circumjacent *ſcoriæ* and cinders with a deep yellow, or ſometimes a white tint. Theſe laſt mentioned cracks, though deep, do not, as I apprehend, paſs the *ſtratum* formed by the laſt eruption, and which, from its extreme thickneſs, particularly in the valley, will probably retain a great degree of heat for ſome years to come, as did a thick *ſtratum* of lava that ran into the *foſſa grande* in the year 1767.

The number and ſize of the ſtones, or, more properly ſpeaking, of the fragments of lava which have been thrown out of the volcano in the courſe of the laſt eruption, and which lie ſcattered thick on the cone of Veſuvius, and at the foot of it, is really incredible. The largeſt we meaſured was in circumference no leſs than one hundred and eight Engliſh feet, and ſeventeen feet high. It is a ſolid block, and is much vitrified: in ſome parts of it there are large pieces of pure glaſs, of a brown yellow colour, like that of which our common bottles are made, and throughout its pores ſeem to be filled with perfect vitrifications of the ſame ſort. The ſpot where it alighted is plainly marked by a deep impreſſion almoſt at the foot of the cone of the volcano, and it took three bounds before it ſettled, as is plainly perceived by the marks

marks it has left on the ground, and by the ſtones which it has pounded to atoms under its prodigious weight. When we conſider the enormous ſize and weight of ſuch a ſolid maſs, thrown at leaſt a quarter of a mile clear of the mouth of the volcano, we can but admire the wonderful powers of nature, of which, being ſo very ſeldom within the reach of human inſpection, we are in general too apt to judge upon much too ſmall a ſcale.

Another ſolid block of ancient lava, ſixty-ſix feet in circumference, and nineteen feet high, being nearly of a ſpherical ſhape, was thrown out at the ſame time, and lies near the former. This ſtone, which has the marks of having been rounded, nay almoſt poliſhed, by continual rolling in torrents, or on the ſea-ſhore, and which yet has been ſo undoubtedly thrown out of the volcano, may be the ſubject of curious ſpeculations (x). Another block of ſolid lava that was thrown much farther, and lies in the valley between the cone of Veſuvius and the Hermitage, is ſixteen feet high, and ninety-two feet in circumference, though it plainly appears, by the large fragments that lie round, and were detached from it by the ſhock

(x) Or may not this ſtone be a ſpherical volcanic baſalt, ſuch as one of forty-five feet in circumference, deſcribed by Monſ. FAUJAS DE ST. FOND, in p. 155. of his curious book on the ſubject of extinguiſhed volcanos?

of

of its fall, that it muſt have been twice as conſiderable when in the air.

There are thouſands of very large fragments of different ſpecies of ancient and modern lavas, that lie ſcattered by the late exploſions on the cone of Veſuvius, and in the vallies at its foot; but theſe three were the largeſt of thoſe we meaſured (y).

We found alſo many fragments of thoſe volcanic bombs that burſt in the air, as mentioned in the former part of this journal; and ſome entire, having fallen to the ground without burſting. The freſh red-hot and liquid lava having been thrown up with numberleſs fragments of ancient lavas, the latter were often cloſely enveloped by the former; and probably when ſuch fragments of lava were porous and full of air bubbles, as is often the caſe, the extreme outward heat, ſuddenly rarifying the confined air, cauſed an exploſion. When theſe fragments were of a more compact lava they did not explode, but were ſimply incloſed by the freſh lava, and acquired a ſpherical form by whirling in the air, or rolling down the ſteep ſides of the volcano.

(y) We meaſured two other ſtones in the valley between Somma and Veſuvius; the one was twenty-two feet and a half long, thirteen feet and a half broad, and ten feet high; the other, eleven feet and a half high, and ſeventy-two feet in circumference.

The ſhell or outward coat of the bombs that burſt, and of which we found ſeveral pieces, was always compoſed of freſh lava, in which many ſplinters of the more ancient lava that had been incloſed are ſeen ſticking. I was much pleaſed with this diſcovery, having been greatly puzzled for an explanation of this volcanic operation, which was new to me, and which was very frequent during the eruption of the 9th of Auguſt.

The phenomenon of the natural ſpun-glaſs, which fell at Ottaiano with the aſhes on the 5th of Auguſt, was likewiſe clearly explained to me here. I have already mentioned, that the lava thrown up by this eruption was in general more perfectly vitrified than that of any former eruption, which appeared plainly upon a nearer examination of the fragments of freſh lava, the pores of which we generally found full of a pure vitrification, and the *ſcoriæ* themſelves, upon a cloſe examination with a magnifying glaſs, appeared like a confuſed heap of filaments of a foul vitrification. When a piece of the ſolid freſh lava had been cracked in its fall without ſeparating entirely, we always ſaw capillary fibres of perfect glaſs, reaching from ſide to ſide within the cracks. If I may be allowed a mean compariſon, which, however, conveys the idea of what I wiſh to explain better than any other I can think of, this lava reſembled a rich Parmeſan cheeſe,

cheeſe, which, when broken and gently ſeparated, ſpins out tranſparent filaments from the little cells that contained the clammy liquor of which thoſe filaments were compoſed. The natural ſpun-glaſs, then, that fell at Ottaiano during this eruption, as well as that which fell in the Iſle of Bourbon in the year 1766, muſt have been formed, moſt probably, by the operation of ſuch a ſort of lava as has been juſt deſcribed, cracking and ſeparating in the air at the time of its emiſſion from the craters of the volcanos, and by that means ſpinning out the pure vitrified matter from its pores or cells, the wind at the ſame time carrying off thoſe filaments of glaſs as faſt as they were produced.

I obſerved, ſticking to ſome very large fragments of the new lava, which were of a cloſe grain, ſome pieces of a ſubſtance, whoſe texture very much reſembled that of a true pumice ſtone; and, upon a cloſe examination, and having ſeparated them from the lava, I perceived, that this ſubſtance had actually been forced out of the minute pores of the ſolid ſtone itſelf, and was a collection of fine vitreous fibres or filaments, confounded together at the time of their being preſſed out by the contraction of the large fragments of lava in cooling, and which had bent downwards by their own weight. This curious ſubſtance has the lightneſs of a

pumice, and reſembles it in every reſpect except being of a darker colour.

When the pores of the freſh ſolid lava were large and filled with pure vitrified matter, we found that matter ſometimes blown into bubbles on its ſurface, I ſuppoſe, by the air which had been forced out at the time the lava contracted itſelf in cooling: thoſe bubbles, being thin, ſhewed that this volcanic glaſs has the kind of tranſparency of our common glaſs bottles, and is like them of a dirty yellow colour. I detached with a hammer ſome large pieces of this kind of glaſs as big as my fiſt, which adhered to, and was incorporated with, ſome of the larger fragments of lava, and, though of the ſame kind, from their thickneſs they appeared perfectly black, and were opaque.

Another particularity is remarkable in the lava of this eruption: many detached pieces of it are in the ſhape of a barley-corn or of a plumb-ſtone, ſmall at each end, and thick in the middle. We picked up ſeveral, and ſaw many more which were too heavy for us to carry off, for they muſt have weighed more than ſixty pounds; ſome of the ſmaller ones did not weigh an ounce. I ſuppoſe them to be drops from the liquid fountain of fire of the 8th of Auguſt, which might very naturally acquire ſuch a form in their fall; but the peaſants in the neighbourhood

bourhood of Veſuvius are well convinced that they are the thunder-bolts that fell with the volcanic lightning.

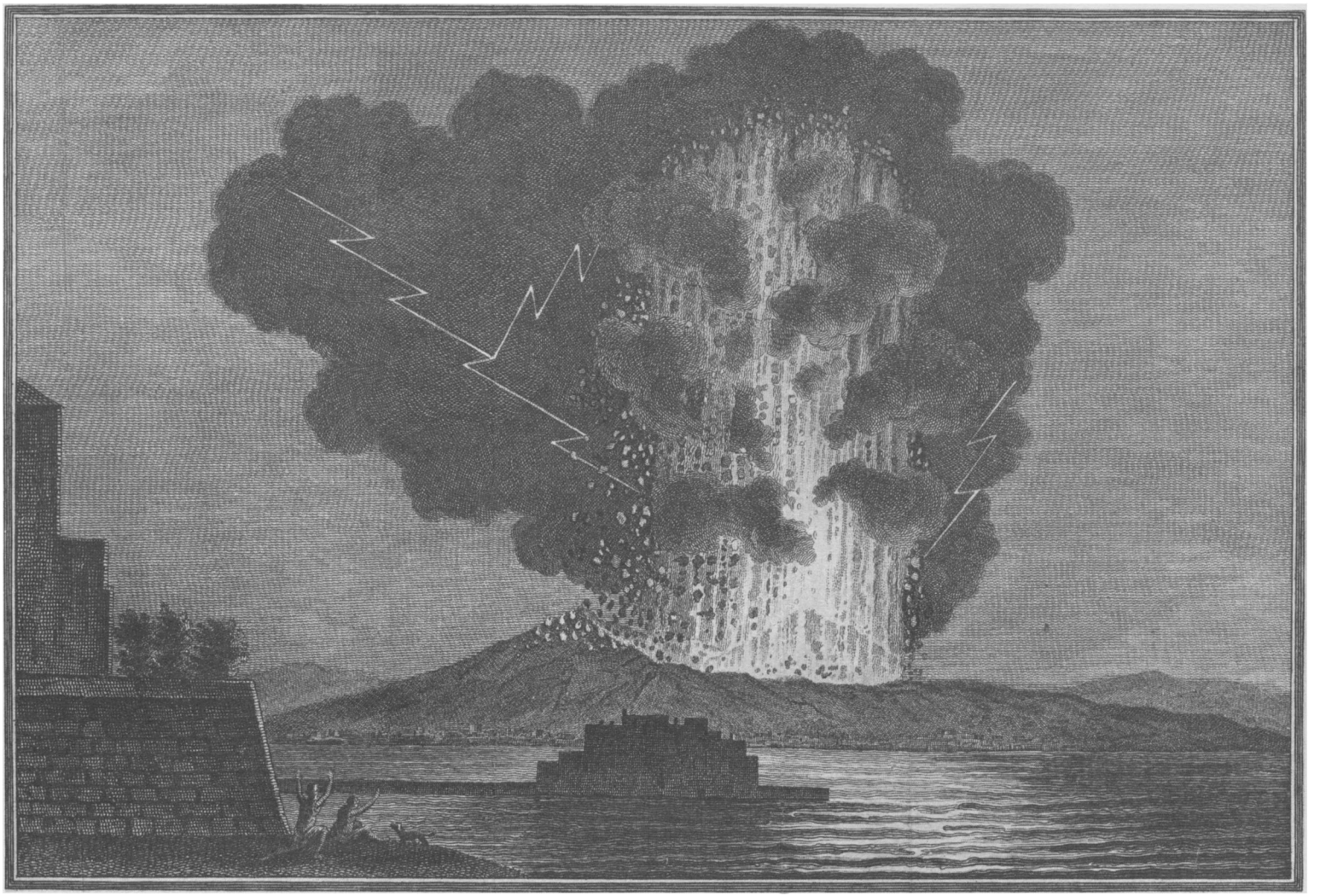
We found many of the volcanic bombs or, properly ſpeaking, round balls of freſh lava, large and ſmall; all of which have a *nucleus* compoſed of a fragment of more ancient and ſolid lava. There were alſo ſome other curious vitrifications, very different from any I had ever ſeen before, mixed with the late fallen ſhower of huge *ſcoriæ* and maſſes of lava.

Though I have endeavoured to be as particular and clear as poſſible in the deſcription I have given of the curious ſubſtances produced by the late eruption of Veſuvius, yet, as ſpecimens of thoſe ſubſtances will explain more at one ſight than I can pretend to do by whole pages in writing, I ſhall not fail to ſend you, by the firſt favourable opportunity, a collection of them, which I have ſet apart for that purpoſe, particularly as, I flatter myſelf, they may ſerve to give ſome light into a hitherto obſcure ſubject: I mean, the nature and manner of the formation of pumice-ſtones.

Veſuvius continues to ſmoke conſiderably, and we had a ſlight ſhock of an earthquake yeſterday; ſo that I do not think, notwithſtanding the late eruptions having been ſo very conſiderable, that the volcano has vented itſelf ſo ſufficiently as to remain long quiet.

I muſt now, SIR, beg your pardon if I have treſpaſſed too much upon your time: I meant to be ſhort, clear, and explicit; and if, by aiming at the two latter, I have failed in the former, I hope I ſhall be excuſed, and that you will pleaſe to take the will for the deed.

I am, &c.



F. Progenie del.

Engraved by Bestre.

View of the Eruption of M. Vesuvius Augt. 8th. 1779 from Pausilipo.